15. **Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.**

Show that the *eastward deviation* of bodies falling from a great height is

$$E_d=\frac{4\pi t(H-\frac{1}{2}\triangle)\cos\phi}{3T}.$$

Solutions to these problems should be received on or before August 1st.

DIOPHANTINE ANALYSIS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS TO PROBLEMS.

5. **Proposed by ISAAC L. BEVERAGE, Monterey, Virginia.**

Find three numbers the sum of the squares of any two of which diminished by their product shall be a square number.

Solution by ARTEMAS MARTIN, LL. D., U. S. Coast and Geodetic Survey Office, Washington, D. C.

Let rx, ry, rz represent the numbers. Then we must satisfy

$$x^2-xy+y^2=\square\ \ldots.(1),$$
$$y^2-yz+z^2=\square\ \ldots.(2),$$
$$x^2-xz+z^2=\square\ \ldots.(3),$$

rejecting the square factor r^2.

Assume $x=2pq-q^2$, $y=p^2-q^2$, and (1) is satisfied. If we take $p=3$, $q=1$, we have $x=5$, $y=8$, and by substitution (2) and (3) become

$$z^2-5z+25=\square\ \ldots.(4),$$
$$z^2-8z+64=\square\ \ldots.(5).$$

Now put $(5)=(z-2n)^2$ and we get $z=\dfrac{16-n^2}{2-n}$.

Substituting this value of z in (4) and reducing, $n^4-5n^3+3n^2-20n+196=\square=(n^2-\frac{5}{2}n+14)^2$ say, whence $n=\frac{8}{5}$; therefore $z=\frac{168}{5}$, and, taking $r=5$, $rx=25$, $ry=40$, $rz=168$, three numbers satisfying the conditions of the problem,

Also solved by *H. W. DRAUGHON*, and *G. B. M. ZERR*.

6. **Proposed by Professor G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.**

Find three whole numbers the sum of any two of which is a cube.

Solution by H. W. DRAUGHON, Clinton, Louisiana.

Let the three numbers be, $\frac{1}{2}(x^3+y^3-z^3)$, $\frac{1}{2}(x^3-y^3+z^3)$, and $\frac{1}{2}(y^3-x^3+z^3)$, then,

$$\tfrac{1}{2}(x^3+y^3-z^3)+\tfrac{1}{2}(z^3-y^3+z^3)=x^3,$$
$$\tfrac{1}{2}(x^3+y^3-z^3)+\tfrac{1}{2}(y^3-x^3+z^3)=y^3,\text{ and}$$
$$\tfrac{1}{2}(y^3-x^3+z^3)+\tfrac{1}{2}(x^3-y^3+z^3)=z^3.$$

In order that the numbers may be positive and integral we must make